Malnutrition in the hospitals: Still big problem

Incidence and prevalence in hospital

S. Kiliçturgay (Turkey)
Malnutrition; incidence and prevalence in hospital

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Uludağ University Medical Faculty, TURKEY
Malnutrition; defined as low or excess of energy, protein and other nutrients

Who should be treated?

5.3 %  38.3 % (+ 19.4 % obese)
Importance of malnutrition

– increased infectious complications
– increased length of stay
– increased readmission
– delayed recovery
– increased mortality

increased treatment costs
(£ 266 million annually)

Effect of nutritional support in malnourished patients

Odds ratio 0.59 (95% CI 0.45 to 0.72); n 3258; 30 sets RCT

No nutritional support
Nutritional support

Mortality (%)

Figure 1.6. Meta-analysis of the effects of nutritional support (30 sets of randomized controlled trials of oral nutritional supplements and enteral tube feeding) on mortality (from Stratton et al. 2003). RCT - randomised controlled trials; CI - confidence interval; n - number of patients included in the analysis.

Stratton R. Basics in Clinical Nutrition 2004

Malnutrition in the hospitals: Still big problem
• **Incidence** is the number of new cases of a condition (or disease) that arise during a specific period of time, such as a year. It is often expressed as a percentage of a population.
  • Incidence conveys the likelihood that an individual in that population will be affected by the condition.
  • useful to epidemiologist because it is a measure of the risk of disease.

• **Prevalence** is defined as the number of individuals with a certain disease in a population at a specified time divided by the number of individuals in the population at that time.
  • simply means "proportion"
  (typically expressed as a percentage)
  • does not convey information about risk.
Among hospitalised patients, protein-energy malnutrition occurs in 20% to 60%.

Guidelines for the use of parenteral and enteral nutrition in adult and paediatric patients JPEN J2002
Malnutrition in the hospitals: Still a big problem

in Europe & North America

40 – 50 %

Edington, Clinical Nutr 2000,
Bruun LL Clinical Nutr 1999,
Corish CA BJN 2000,
Middleton MH 2001,
Hospital malnutrition: the Brazilian national survey (IBRANUTRI): a study of 4000 patients.

Malnutrition: 48.1%
Severe malnutrition: 12.5%

Waitzberg DL, Nutrition, 2001
2211 hospitalized patients
The SGA $\rightarrow$ 242 pts (11%) with malnutrition,
The Combination Criteria $\rightarrow$ 345 pts (15.6%) with malnutrition

Nursal TZ, Nutrition, 2005

Overall 29139 hospitalized patients,
The NRS-2002 $\rightarrow$ 15 % of the patients had nutritional risk

KEPAN, ESPEN-İstanbul, 2006
The factors increasing the risk of malnutrition

Elderly patients
- Deterioration in taste / smell / appetite
- Eating disturbances
- Age-related co-existing medical conditions
- Polypharmacy
- Social isolation and financial deprivation

• Some special problems
cancer-COPD-cardiac cachexia-IBD......

• Long hospitalisation
two-thirds of weight lost during hospitalisation.

Pichard C,. Am J Clin Nutr 2004
Waitzberg DL, Nutrition, 2001
McWhirter JP, BMJ 1994

Malnutrition in the hospitals: Still big problem
The prevalence of malnutrition in nursing home is rated between 29 – 74 % and for the hospital patients between 19 – 65 %

increase in age → increase in malnutrition rate

Anthropometric, biochemical, and haematological parameters of patients by age-groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Young-old, (&lt; 70)</th>
<th>Old, (70-80)</th>
<th>Old-old, (&gt; 80)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>59.8 ± 11.0</td>
<td>57.4 ± 11.4</td>
<td>48.0 ± 11.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>160.0 ± 5.5</td>
<td>154.8 ± 8.4</td>
<td>153.8 ± 9.1</td>
<td>0.134</td>
</tr>
<tr>
<td>Knee heel height (cm)</td>
<td>48.8 ± 2.4</td>
<td>47.3 ± 3.0</td>
<td>47.2 ± 3.2</td>
<td>0.320</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>23.4 ± 4.3</td>
<td>23.9 ± 4.1</td>
<td>20.2 ± 3.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Triceps skin fold thickness (mm)</td>
<td>17.4 ± 7.0</td>
<td>18.7 ± 9.2</td>
<td>13.4 ± 6.8</td>
<td>0.002</td>
</tr>
<tr>
<td>Mid-arm circumference (cm)</td>
<td>28.4 ± 3.4</td>
<td>26.4 ± 4.2</td>
<td>23.4 ± 4.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>AMC (cm)</td>
<td>23.0 ± 3.1</td>
<td>20.6 ± 2.7</td>
<td>19.2 ± 3.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CAMA (cm²)</td>
<td>33.4 ± 11.7</td>
<td>26.1 ± 8.5</td>
<td>21.9 ± 9.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Biochemical and haematological</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>38.0 ± 6.6</td>
<td>34.5 ± 5.9</td>
<td>33.8 ± 5.1</td>
<td>0.111</td>
</tr>
<tr>
<td>Haemoglobin (g/L)</td>
<td>130 ± 12</td>
<td>117 ± 22</td>
<td>113 ± 16</td>
<td>0.034</td>
</tr>
<tr>
<td>Lymphocytes (x 10⁶ /L)</td>
<td>1.7 ± 0.7</td>
<td>1.6 ± 0.8</td>
<td>1.4 ± 0.7</td>
<td>0.265</td>
</tr>
</tbody>
</table>

malnourished / nourished subjects 0/9 3/43 17/48 (p=0.01)

NC Shum Hong Kong Med J 2005

Malnutrition in the hospitals: Still big problem
The factors increasing the risk of malnutrition

Elderly patients

– Deterioration in taste / smell / appetite
– Eating disturbances
– Age-related co-existing medical conditions
– Polypharmacy
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• Some special problems
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McWhirter JP, BMJ 1994
## Malnutrition in the hospitals: Still big problem

<table>
<thead>
<tr>
<th>Diagnostic group and country</th>
<th>BMI &lt; 20 (%)</th>
<th>Number of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical /mixed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iceland</td>
<td>5</td>
<td>82</td>
</tr>
<tr>
<td>Ireland</td>
<td>13.5</td>
<td>594</td>
</tr>
<tr>
<td>UK (Luton)</td>
<td>14</td>
<td>83</td>
</tr>
<tr>
<td>UK (London)</td>
<td>15 (M) 18 (F)</td>
<td>423</td>
</tr>
<tr>
<td>Switzerland</td>
<td>17.3</td>
<td>995</td>
</tr>
<tr>
<td>UK (Glasgow)</td>
<td>18</td>
<td>219</td>
</tr>
<tr>
<td>Italy</td>
<td>19.3</td>
<td>705</td>
</tr>
<tr>
<td>UK (Cambridge)</td>
<td>21</td>
<td>57</td>
</tr>
<tr>
<td>UK (London)</td>
<td>22</td>
<td>186</td>
</tr>
<tr>
<td>UK (Dundee)</td>
<td>37.4</td>
<td>500</td>
</tr>
<tr>
<td><strong>Elderly</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>16</td>
<td>278</td>
</tr>
<tr>
<td>Belgium</td>
<td>17</td>
<td>151</td>
</tr>
<tr>
<td>Ireland</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>UK (Cambridge)</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>UK (London)</td>
<td>29</td>
<td>65</td>
</tr>
<tr>
<td>UK (Leeds)</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Sweeden</td>
<td>36</td>
<td>337</td>
</tr>
<tr>
<td><strong>COPD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Norway</td>
<td>21</td>
<td>244</td>
</tr>
<tr>
<td>Iceland</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Sweden</td>
<td>36</td>
<td>42</td>
</tr>
<tr>
<td>Switzerland</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>UK</td>
<td>6</td>
<td>808</td>
</tr>
<tr>
<td>UK</td>
<td>13.3</td>
<td>60</td>
</tr>
<tr>
<td>South Africa</td>
<td>13</td>
<td>52</td>
</tr>
</tbody>
</table>
Why does prevalence of malnutrition show difference in the literature?

- Criteria used to assess malnutrition risk is different over 70 test or tools for detection of malnutrition
  - Application problems for different tests
    - the MNA could be completed in 66.1% of all patients, the SGA in 99.2% and the NRS in 98.3%.
  - Different criteria
    - Anthropomeric, biochemical or immunological or mix ??
  - Different cut of values
    - BMI ratio < 20 kg/m², <18.5 kg/m² or <18 kg/m² ..... Which is true ?
  - Different hospitalization periods of patients
    - 30 -90 % of patients lose weight during hospitalization
Different tools, different results

• The prevalence of malnutrition in 155 hospitalised patients, depending on the scoring system used for diagnosis of malnutrition, was 45% to 62%.


• The prevalence of malnutrition ranges from 6.6% to 85% depending on the method used for diagnosis.

  Joosten E. The effect of different diagnostic criteria on the prevalence of malnutrition in a hospitalized geriatric population. Aging, 1999
Comparison of different scoring methods for assessing the nutritional status of hospitalised patients

Fig. 3. Nutritional status determined by four different methods. BMI Body Mass Index; PNRA Prideaux Nutritional Risk Assessment; NRI Nutrition Risk Index; INS Innsbruck Nutrition Score; x axis nutritional status expressed as percentage; y axis percentage of patients (n = 640)

Galvan O. The Middle European Journal of Medicine, 2004
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  over 70 test or tools for detection of malnutrition

- Application problems for different tests
  
  *the MNA could be completed in 66.1% of all patients,*
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- Different cut of values
  BMI ratio < 20 kg/m², <18.5 kg/m² or <18 kg/m²...... Which is true?

- Different hospitalization periods of patients
  30 -90 % of patients lose weight during hospitalization
Comparison of the MNA, SGA and NRS 2002) for nutritional screening and assessment in geriatric hospital patients

<table>
<thead>
<tr>
<th>Total number of participants</th>
<th>n = 121</th>
<th>Correlation with BMI Alb. LOH</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNA completed</td>
<td>80 (66.1 %)</td>
<td>+ + +</td>
</tr>
<tr>
<td>good</td>
<td>24 (30%)</td>
<td>+</td>
</tr>
<tr>
<td>at risk</td>
<td>30 (37.5 %)</td>
<td>-</td>
</tr>
<tr>
<td>malnourished</td>
<td>26 (32.5 %)</td>
<td>-</td>
</tr>
<tr>
<td>SGA completed</td>
<td>120 (99.2 %)</td>
<td>+ - -</td>
</tr>
<tr>
<td>A</td>
<td>66 (55%)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>49 (40.8%)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>5 (4.2%)</td>
<td></td>
</tr>
<tr>
<td>NRS completed</td>
<td>119 (98.3 %)</td>
<td>+ - -</td>
</tr>
<tr>
<td>No risk</td>
<td>43 (36.1%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 3</td>
<td>28 (23.5%)</td>
<td></td>
</tr>
<tr>
<td>≥ 3</td>
<td>48 (40.3%)</td>
<td></td>
</tr>
</tbody>
</table>

Bauer JM, Z Gerontol Geriat, 2005
Because of its association with relevant prognostic parameters the MNA is especially applicable for people who live independently and for cooperative residents of nursing homes. The NRS is a valuable alternative for hospitalised patients and those unable to cooperate.

Bauer JM, Z Gerontol Geriat, 2005
Bauer JM, Aging Clin Exp Res. 2005
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  the MNA could be completed in 66.1% of all patients, the SGA in 99.2% and the NRS in 98.3%.

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  BMI ratio < 20 kg/m², <18.5 kg/m² or <18 kg/m² ...... Which is true ?

• Different hospitalization periods of patients
  30 -90 % of patients lose weight during hospitalization
Prevalence of hospital protein-energy undernutrition

<table>
<thead>
<tr>
<th>Medical/surgical</th>
<th>n</th>
<th>Prevalence (%)</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>351</td>
<td>24</td>
<td>&lt;90% predicted weight</td>
</tr>
<tr>
<td>Surgical</td>
<td>131</td>
<td>22</td>
<td>&lt;90% standard weight/height</td>
</tr>
<tr>
<td>Medical</td>
<td>176</td>
<td>23</td>
<td>&lt;80% weight/height</td>
</tr>
<tr>
<td>Surgical</td>
<td>105</td>
<td>33</td>
<td>&lt;5th centile controls</td>
</tr>
<tr>
<td>Cardiac surgical</td>
<td>47</td>
<td>55</td>
<td>Total body potassium</td>
</tr>
<tr>
<td>Medical</td>
<td>134</td>
<td>48 on admission</td>
<td>LOM score</td>
</tr>
<tr>
<td></td>
<td></td>
<td>62 at 2 wk</td>
<td></td>
</tr>
<tr>
<td>Medical/surgical</td>
<td>200</td>
<td>29</td>
<td>Weight loss &gt; 4.5kg</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>744</td>
<td>19</td>
<td>&lt;2 standard deviation elderly reference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>population</td>
</tr>
<tr>
<td>Medical/surgical</td>
<td>500</td>
<td>40</td>
<td>BMI &lt; 20</td>
</tr>
</tbody>
</table>

LOM=Likelihood of malnutrition; BMI=body mass index
Why high prevalence of malnutrition is often underestimated by medical professionals?

Three possible explanations:

– the lack of training in nutritional assessment and monitoring of patients’ nutritional status,
– the absence of a well-validated laboratory screening tool for malnutrition,
– the lack of a consensus on what constitutes malnutrition.

NC Shum, *Hong Kong Med J*, 2005
Medical education and problems

“doctors and nurses frequently fail to recognise malnutrition because they are not trained to look for it"


A few medical colleges make a serious attempt to teach nutrition to their undergraduates, but most final year students know less about nutrition than about other branches of medicine.

Significant malnutrition was found in 69% of patients.

- Only one patient was identified as being malnourished
- References to nutritional status were recorded in two patient charts.
- History of weight loss, appetite status, current oral intake, and functional status were recorded for less than 33% of patients.

_Harminder S., Malnutrition is prevalent in hospitalized medical patients: Are housestaff identifying the malnourished patient? Nutrition, 2006_
In conclusion

- Malnutrition continues to be a significant problem of hospitalized patients that is under-recognized by medical housestaff.

- Instruction of second-year medical students in assessment of nutritional status does not result in improved knowledge or practice of nutritional assessment in the clinical training years as medical housestaff.

- Additional instruction in nutritional assessment during clinical training needs to be emphasized.

Harminder S., Malnutrition is prevalent in hospitalized medical patients: Are housestaff identifying the malnourished patient? Nutrition, 2006
The problem is not new and still continuing ...........

- The incidence of malnutrition in 500 patients admitted to an acute teaching hospital: 40% of the patients were undernourished and two-thirds lost weight during hospitalisation.


- Only 25 % of pts identified as being at risk of malnutrition
  - Only 60% of pts were screened
  - Only 30% of these pts were monitored


- The prevalence of malnutrition in hospitalized patients in Brazil is high, physician awareness of malnutrition is low, and nutrition therapy is underprescribed.

  *Waitzberg DL, Nutrition, 2001*
To reduce the prevalence of hospital malnutrition

Three consecutive cross-sectional studies carried out in 1998, 2000 and 2003

After 1998

- nutrition nurse education module
- the change in catering practice

  This improved the presentation of food, as well as the taste, texture and moisture content, and resulted in increased food intake and reduced wastage

After 2000

- nutrition-screening tool
- “Better Hospital Food”

Jacqui O’Flynn, Clinical Nutrition, 2005
Malnutrition in the hospitals: Still a big problem

Reduction in the prevalence of malnutrition

The odds ratio 33% (P=0.001).

Figure 2: Percentage of patients in each malnutrition category in the three study years.
Changes in some indicators of good nutritional practice

- Weighing patients on admission increased from 37.5%, 42.9% and 59.6% in 1998, 2000, and 2003 respectively (P<0.001).
- Dietetic referrals increased from 31.5% in 1998 to 41.6% in 2003 (P<0.001)
- Appropriate referrals (the proportion of malnourished patients) also improved, 56.5% in 1998, 71.2% in 2003 (P=0.003)
To reduce the prevalence of hospital malnutrition

implementation of a variety of nutrition care strategies,

– a change in nutritional practice at ward level,
– an increase in the numbers of patients weighed on admission,
– an increase in the number of malnourished patients identified and referred for dietetic intervention.

Jacqui O’Flynn, *Clinical Nutrition*, 2005
Junior doctors are starving too

EDITOR, - Nutrition is indeed given to little attention in hospital. This attitude results not only in undernourished patients but in undernourished doctors. As active resident medical staff, junior doctors out of hours have to visit vending machines in search of nutrition. The appetising choice is usually limited to reheating fatty sausage left from breakfast or watery scrambled egg. Fortunately, chocolate and carbonated sugar are always available, but can these be regarded as adequate nutrition?
Malnutrition in the hospitals: Still big problem